Testing the Bounds of Compassion in Young Children

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Research Article

Keywords: compassion, competition, children, cost, motivation

Posted Date: June 2nd, 2021

DOI: https://doi.org/10.21203/rs.3.rs-545449/v1

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Abstract

Extensive research shows that, under the right circumstances, children are highly prosocial. Less is known about their capacity for compassion. Across five experiments (N = 285), we aimed to capture the bounds of 4-5-year-old children's compassionate behaviour. In the first three experiments we varied cost of compassion by changing the reward (study 1), using explicit instructions (study 2), and ownership (study 3). In the final two experiments we varied the target of the compassionate behaviour, examining adults compared to puppet targets (study 4), and whether the target was an in-group member (study 5). We found strong evidence that cost reduces compassionate responding. By contrast, the recipient of compassion did not appear to influence compassionate responding: children were equally likely to help a human adult and a puppet, and an in-group member and neutral agent. Thus, personal cost appears to be a greater inhibitor to compassionate responding than who compassion is directed toward. These findings demonstrate the environmental factors that may reduce compassionate responding in young children, and call for careful consideration of how to mitigate these to create more positive and socially connected environments for children to flourish.

Introduction

Compassion is a complex prosocial motive, defined as the sensitivity to suffering in self and others, with a commitment to alleviate or prevent it [1]. Though similar to a range of other prosocial competencies, such as sympathy and empathy, as well as kindness and altruism, compassion is, critically, distinct in its focus on engaging and responding to suffering [2]. Compassion is triggered by exposure to distress and suffering, which brings a diverse range of contextually appropriate emotions and actions that drive us to engage in care and prosocial behaviour to alleviate suffering [2]. Typically, compassion is directed towards interactions with kin or allies [3, 4], but can be expanded to a broader range of entities [5], such as strangers (e.g., charity), other species (e.g., whales, primates), and even sentient beings not yet born (e.g., concern about climate change for future generations).

Gilbert [2] proposes an evolutionary account of compassion, suggesting that it is an important biosocial motive, often competing with other motives (such as harm avoidance, status seeking, competition), and as such there are facilitators and inhibitors that turn on and off the compassionate algorithm. In compassion, facilitators can include using a self-reassuring/friendly inner voice tones [6], and using primes of safety and security [7]. Improving facilitators does not necessarily result in compassionate behaviour if there are inhibitors present [8]. For example, there is an inherent tendency to form groups and discriminate based on in- and out-group biases [9]. Group biases influence compassionate responding, whereby compassion can be turned on for an in-group member (e.g., family, friend) and be inhibited for an out-group member (e.g., stranger). In the fields of altruism, prosociality, and empathy, other biases have been found to reduce helping behaviour, such as the bystander effect [10], personal cost to self [11, 12], and competitive self-interest [13].
It has been well established that children engage in instrumental and costly helping behaviours and will frequently share resources to help others [14, 15, 16]. Many studies have also examined boundary conditions on children's helping; Children help family more than strangers [17], in-groups more than out-groups [18], and those who have been previously helpful more than those who have not [17]. In some cases, children will even help when their peers do not [19]. However, these studies generally have not examined how children respond to targets who express explicit suffering, and, in many cases, there is no cost to children's helping behaviour—a factor that has been shown to reduce compassionate responding [12].

Research also shows that children engage in sympathetic and empathic responding [20]. However, many of these studies have focused on physiological responses, such as pupil dilation [21], rather than a behavioural response [22, 15]. Some studies have examined prosocial behaviour in the context of more explicit emotional suffering (i.e., visibly upset individuals). Findings suggest that toddlers typically respond to another's distress by either seeking comfort in their parents, exclaiming sympathetic sentiments towards the distressed target, or even ignoring the distressed target [23, 20]. While less frequent, some toddlers have been shown to exhibit prosocial behaviours in response to another's distress [24, 25]. Finally, Trommsorff and colleagues [26] exposed preschool aged children to a distressed adult and found that prosocial behaviour toward the target (that involved personal cost) was positively related to sympathy and negatively related to self-focused distress.

**The Current Study**

While extensive work has examined compassionate-adjacent behaviour, we are not aware of any studies that have examined contextual factors that may inhibit or facilitate compassionate behaviour in children. Drawing from the adult literature, we systematically test a range of potential inhibitors and facilitators to identify the bounds of compassionate responding in young children. In the first three studies, we engage in a more nuanced exploration of cost, varying the reward (Study 1), the presence of explicit instructions (Study 2), and the ownership of resources (Study 3). Across all three studies, we predicted that personal cost would inhibit compassionate responding. In studies 4 and 5 we examine how the target of the compassion varies responding, varying adults vs. puppets (Study 4) and the role of group membership (Study 5). Here, we predict that having targets that were adults (vs. puppets) and in-groups (vs. out-groups) would facilitate compassionate responding.

**General Method**

All studies were registered on the Open Science Framework (see https://osf.io/e78tb/?view_only=ff46e0f0a9894023b507af5a526afac6). All the experimental protocols used across the five studies were cleared and approved in accordance with the ethical review processes of the University of Queensland, and within the guidelines of the National Health and Medical Research Council's guidelines (#2019000651). All studies employed slight variations on the Green et al., [12] compassionate responding
paradigm in which children played a series of games alongside a puppet. In each game, the puppet is unable to complete the game and the child can opt to help or not. In the original paradigm, Green et al. varied whether there was a personal cost to the child to help the puppet (i.e. they had to give up their resources so the puppet can complete the task). High cost helping was considered compassionate behaviour. In the current studies, we replicated the high cost condition, thus all helping behaviour incurs personal cost, thus is considered compassionate behaviour.

Prior to being introduced to the games, children picked their three favourite stickers from a large selection. These constituted the rewards for completing the tasks in all studies with the exception of the no reward condition in Study 1. Children played three games with three different puppets—Millie the Monkey, Ellie the Elephant and George the Giraffe (images of the puppets are included in supplementary material). Each puppet participated in one of the three tasks and was never repeatedly paired with one task due to the randomization of puppets and task order.

Three tasks were used across each of the five studies. These were the (1) Sorting Task, (2) Marble Task and (3) Puzzle Task, which each require a participant to place objects together (e.g., place beads onto a stick; see supplementary materials for details of each task). Each task had two sets of equipment so that the child and puppet/adult could complete the tasks separately. In each scenario, the child had the correct number of pieces to finish the task, while the puppet/adult did not have enough pieces (missing two pieces) and hence was unable to finish the task unless the children acted compassionately and shared their pieces.

In each game the puppet/adult realized that they did not have sufficient pieces to finish the task and became distressed that they were unable to receive a sticker (e.g. “Oh no...I don’t have enough < appropriate to the task pieces > to finish the game. Now I’m not going to get a sticker...what am I going to do?”). There were three distress prompts which allowed three opportunities for the child to help. The experimenter ended the task as soon as the child helped, or after the three prompts if the child did not help. Full scripts for all prompts are provided in supplementary materials.

We also assessed children's perception of the emotion of the puppet for all studies. At the end of the task, children were asked to indicate how the puppet felt when they realised that they did not have enough pieces to complete the task (see Supplementary material).

All studies in this manuscript made minor variations off this initial design, as described below.

**Study 1: I’ll Help You, But What’s The Cost?**

In this study we aimed to systematically explore how reward influences children’s compassionate responding. Green et al. [12] gave children their stickers at the end of all three tasks. In this way, children may have been extrinsically rewarded by the stickers, decreasing their intrinsic motivation to help [27]. To explore this, we examined how an immediate reward (after each task) and no reward (although children still received stickers at the end of the entire experiment for their participation but they did not know this)
would influence children's responding compared to the cost condition adapted from the Green et al. [12] study. Notably, the no reward tests children's propensity to help in the absence of external reward. By contrast, children in the immediate reward condition received their sticker during the task, while the (slow) puppet was still finishing. This meant that they could help without losing their reward, thereby allowing us to isolate the role of reward in this paradigm. We predicted that the removal of the cost (no reward and immediate reward) would facilitate compassionate responding by children. Additionally, Green et al. [12] observed that children who did not help either consoled or disengaged from the puppet. Therefore, this experiment also examined these behaviours as an exploratory addition to the study.

Method

All participants were recruited through local childcare centers or a database of parents who had previously agreed to participate in research at a local university. Participation took place either at the childcare center or in a dedicated child-friendly testing space at the local university. Informed consent was provided by the parents for all participants. An online randomizer (https://www.randomizer.org/) was used to allocate child to condition. Once the session began, children were introduced to the puppet/adult and the experimenter explained the rules of the task. The task only began after children indicated that they understood the task. Upon completion of the task, children and caregivers were thanked and children who participated at the university were offered a reward as a thank you for participating. This procedure was the same for this and all other studies in this paper.

In this study we adapted the cost condition from the original paradigm [12], where the child had insufficient pieces to help the puppet and would, thus, have to give up a reward to act compassionately. In addition to this baseline (cost), we included two additional conditions: one where children did not receive any stickers during the game (no reward) and one where children received a reward after each task instead of at the end of all three (reward immediate condition). Notably, when the puppet was distressed in the no reward condition, they did not refer to the sticker in their distress prompt—instead saying "Oh no... I don't have enough <task pieces> to finish the game. Now I am not going to be able to finish the game... what am I going to do?".

Participants

Sixty-eight children in total participated in this study. Eight children were excluded from the final analysis due to participant error ($n = 1$), experimenter error ($n = 6$) or failing to engage with the task ($n = 1$). The final sample included 60 children (22 males, 38 females) aged between 45 and 60 months ($M = 53.22, SD = 3.84$).

Coding

Helping was coded per task on a scale of 0-4. If a child helped without any prompting, they received the highest score and the more prompts required the lower the helping score. Children who did not help at all
received a score of 0. Coding is identical for this and all further studies in this manuscript. Full coding scheme and reliability analyses for all studies are reported in supplementary material.

Results

In all studies, preliminary analyses revealed no effect of age, sex, task type, task order, puppet, and testing location on helping behaviour, thus these factors were not considered further.

Effect of Cost on Helping Behaviour

A one-way between groups ANOVA was conducted to evaluate the effect of condition on helping behaviour. There was a significant effect of condition on helping behaviour, \( F(2, 30.18) = 4.85, p = 0.015, h^2 = 0.13 \) (Figure 1). Post-hoc multiple comparisons, using Tukey's HSD test, revealed that helping behaviour was significantly higher for children in the reward immediate condition compared to children in the cost condition (Table 1). No other comparisons were significantly different.

Table 1 Statistical results for helping behaviour analysis by condition.

<table>
<thead>
<tr>
<th>Condition</th>
<th>M (SD)</th>
<th>t(57)</th>
<th>p</th>
<th>Cohen's d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost vs. Reward Immediate</td>
<td>0.40 (1.10)</td>
<td>-2.88</td>
<td>.030</td>
<td>0.87</td>
</tr>
<tr>
<td>Cost vs. No Reward</td>
<td>3.10 (4.24)</td>
<td>-1.23</td>
<td>.199</td>
<td>0.56</td>
</tr>
<tr>
<td>Reward Immediate vs. No Reward</td>
<td>1.55 (2.69)</td>
<td>1.65</td>
<td>.363</td>
<td>0.44</td>
</tr>
</tbody>
</table>

Exploratory Analysis

With our scoring system, children who helped immediately and consistently across tasks received a higher score than children who helped later and rarely. However, it is possible that proportionately more children helped in the conditions that involved a sticker as a reward (e.g. cost and reward immediate conditions) than those without a sticker reward (e.g. no reward). To examine this, we analysed whether the proportion of children helping differed across conditions. Additionally, for children who did not help, we examined whether the proportions of children who consoled or disengaged from the distressed puppet differed across conditions. These were both coded in binary 0-1 (helped/not, consoled/not, disengaged/not). See supplementary material for full coding scheme. A chi-square test of homogeneity was conducted to examine any differences in helping and disengaging behaviours. Fisher's Exact Probability Test was used for consoling behaviour because three of the expected cell counts were less than five.

Helping. A total of 18 children helped the distressed puppet. This included 3/30 children in the cost condition, 8/20 children in the reward immediate condition, and 7/20 children in the no reward condition.
(see Figure 2). There was no significant difference in the proportion of children that helped across the three conditions, $\chi^2 (2, N = 60) = 3.33, p = .189, \phi = .236$.

**Consoling.** A total of 10 children consoled the distressed puppet when they did not help. There was no significant difference in proportion of children consoling the distressed puppet when they did not help across all three conditions, indicated by Fisher’s Exact Test, $p = .572$. Across all studies Figures on consoling are presented in supplementary material.

**Disengaging.** A total of 31 children disengaged from the distressed puppet when they did not help. This included 15/20 children in the cost condition, 8/20 children in the reward immediate and no reward condition. There was a significant difference in proportion of children disengaging from the distressed puppet when they did not help across conditions, $\chi^2 (2, N = 60) = 6.54, p = .038, \phi = .330$. Following this, post-hoc pairwise comparisons were conducted using z-tests. The proportion of children who disengaged from the distressed puppet was significantly higher in the cost condition than in the reward immediate and no reward condition, $p = .038$. There was no significant difference between the proportion of children who disengaged from the distressed puppet in the reward immediate and no reward condition. Across all studies Figures on disengaging are presented in supplementary material.

In Study 1 we found that children help more in the immediate reward condition than the cost condition, indicating that cost does reduce helping. Moreover, of children who did not help, those in the cost condition were significantly more likely to disengage from the puppet than those in the immediate reward condition. However, there was no difference between the no reward condition and either the cost or reward immediate condition for these measures. We also found no effect of condition on the proportion of children who helped, or the proportion of children who consoled when they did not help.

**Study 2: Explicit Instructions**

In Study 2 we aimed to explore how explicit instructions impact children’s compassionate responding. In the original paradigm [12] children were not given explicit instructions about whether they could help the puppet. In this way, the rules of the game were ambiguous, so children may have perceived that the compassionate action was against the rules and thus did not respond compassionately for fear of punishment [28]. This aligns with findings that sharing behaviours rely on children’s motivations and explicit cues for scaffolding and direction [14, 29, 30]. This carries important implications for observations of compassionate behaviours experimentally where children are in an unfamiliar situation with a stranger and may therefore require explicit instructions to overcome this inhibitor to compassionate responding. It may also be possible that children in Green et al., [12] interpreted the tasks as competitive (doing the same thing at the same time in a shared space, but not together). Competition has been shown to impede prosocial behaviour [31] and may also have acted as an inhibitor to compassion.
To examine how these two factors (instructions and perceived competition) influence compassionate responding, we again replicated the cost condition from the original paradigm. However, here we systematically varied whether children were given explicit instructions that they could share and the game was not a competition, or not (thus keeping the rules of the game ambiguous). We predicted that children who received explicit permission to share would be more compassionate than those who do not.

**Method**

This study adapted the cost condition from the original paradigm [12], but varied whether the experimenter explicitly told children that they could share and demonstrated how to share prior to beginning the game. In addition, children were told the game was not a competition (explicit instruction condition) or did not tell them this (implicit instruction condition, as per the original paradigm).

**Participants**

In Study 2, 46 children were recruited, but five children were excluded from the final analysis due to participant or experimenter error. The final sample included 41 children (20 males, 21 females), aged between 46 and 62 months ($M = 53.07, SD = 4.18$).

**Results**

**Effect of Instruction Type on Helping Behaviour**

A one-way between groups ANOVA was conducted to evaluate the effect of condition on helping behaviour. There was no significant effect of condition on helping behaviour, $F(1, 38) = 3.26, p = .079, \eta^2 = .079$, such that there was no significant difference in the amount that children helped in the explicit ($M = 3.20, SD = 4.11$) and non-explicit ($M = 1.15, SD = 2.98$) conditions.

**Exploratory Analyses**

**Helping.** A total of 12 children helped the distressed puppet. This included 9/20 children in the explicit instructions condition and 3/20 children in the non-explicit instructions condition (Figure 3). The proportion of children who helped the puppet in the explicit instructions condition was significantly greater than the proportion of children who helped in the control condition, $\chi^2 (1, N = 40) = 4.29, p = .038$.

**Figure 3.** Percentage of children who helped or did not help within each condition.

**Consoling.** A total of two children consoled the distressed agent when they did not help. There was no significant difference in the proportion of children consoling the distressed agent when they did not help across both conditions, indicated by Fisher’s Exact Test, $p = .708$.

**Disengaging.** A total of 18 children disengaged from the distressed puppet when they did not help. There was no significant difference in the proportion of children disengaging from the distressed puppet when they did not help across both conditions, indicated by Fisher’s Exact Test, $p = .624$. 
In Study 2 we found that explicit instructions increased the proportion of children who helped, such that significantly more children helped the puppet in the explicit instruction condition than in the non-explicit instruction condition. We found no condition differences in overall rates of helping, or the proportion of children who disengaged or consoled the puppet when they did not help.

**Study 3: Not Mine, But Ours**

In Study 3 we explore the role of resource ownership on children’s compassionate responding. In the original paradigm [12] each child and puppet are given their own container of resources to compete the task. This may have created ownership bias—and past work shows that children are less likely to share resources that belong to them [25]. Svetlova and colleagues [25] theorize that this reflects children’s inability to overcome possessiveness and object ownership to help another. Interestingly, children even display a preference for (‘endowment effect’) items arbitrarily positioned as their own [32]; defending these items aggressively compared to items ‘owned’ by the wider classroom [33].

Study 3 built on these findings in order to gain insight into how ownership effects motivations to act compassionately. We again replicated the cost condition from the Green et al. [12] paradigm, but varied whether the resources were owned by the child (individual condition) or part of a shared resource pool (shared condition). We predicted that children would help more in the shared resource condition than the individual resource condition.

**Method**

This study adapted the cost condition from the original paradigm [12]. However, children's resources (e.g. puzzle pieces) were either presented in separate boxes, so the child had their own resources (individual condition, as per the original paradigm), or presented in a large communal box to indicate that they are from a shared resource pool (shared condition). In the shared condition, children were also explicitly told that the resources were shared.

**Participants**

In Study 3, 45 children were recruited, but five children were excluded from the final analysis due to participant or experimenter error. The final sample included 40 children (15 males, 25 females) participated, aged between 48 and 61 months ($M = 52.55$, $SD = 3.44$).

**Results**

**Effect of Resource Status on Helping Behaviour**

A one-way between groups ANOVA was conducted to evaluate the effect of condition on helping behaviour. There was no significant effect of condition on helping behaviour, $F(1, 39) = .11$, $p = .743$, $\eta^2 = .003$, such that there was no significant difference in the amount that children gave in the shared ($M = 1.9$, $SD = 3.59$) or individual ($M = 1.55$, $SD = 3.27$) conditions.
**Exploratory Analyses**

**Helping.** A total of nine children helped the distressed puppet. This included 5/21 children in the shared resources condition and 4/20 children in the individual resources condition (Figure 4). There was no significant difference in the proportion of children who helped across conditions, $\chi^2 (1, N = 41) = .087, p = .768$.

*Figure 4.* Percentage of children who helped or did not help within each condition.

**Consoling.** One child in the individual resources condition consoled the distressed puppet when they did not help. There were no consoling behaviours in the shared resources condition. There was no significant difference in the proportion of children consoling the distressed puppet when they did not help across both conditions, indicated by Fisher's Exact Test, $p = .500$.

**Disengaging.** A total of 28 children disengaged from the distressed puppet when they did not help. There was no significant difference in the proportion of children disengaging from the distressed puppet when they did not help across both conditions, indicated by Fisher's Exact Test, $p = .700$.

In Study 3 we found no effect of ownership on children's overall or proportionate helping, consoling or disengaging behaviour. Children were equally likely to help, and equally likely to disengage or console when they did not help, regardless of whether the task pieces were shared or owned by the individual.

**Study 4: Who Am I Helping? (Adult Vs. Puppet Target)**

In Study 4 we aim to explore how the target of compassion influences children's compassionate responding. Across all variations of the original paradigm [12] puppets were used as the distressed target. Children possess the ability to attribute biological and psychological characteristics to inanimate objects including stuffed toys and imaginary companions [34]. Moreover, several studies have shown that children treat puppets in a similar manner to humans [35] and identify with a puppet in-group [36]. However, other work has found that children can understand human emotions better than puppet emotions [37]. Given that compassion defined by the motivation to alleviate another's suffering, it is critical that children understand the suffering of the target. Perhaps children are not sufficiently sensitive to a puppet target to elicit compassionate responding. We, therefore, vary whether the target of compassion is a puppet or an adult human — predicting that children will behave more compassionately to human targets than adult targets.

**Method**

We again replicated the cost condition in the original compassionate responding paradigm [12]. However, we varied whether the distressed agent was a puppet (puppet condition) or an adult human (human condition). Unlike other conditions, in the adult condition we also had two adult experimenters, one who was the confederate in the study completing the tasks with the child, and a second adult experimenter.
providing instructions. We therefore measured social referencing behaviour of the children to the adult experimenter.

Participants

In study 4, 44 children were recruited, but four children were excluded from the final analysis due to participant or experimenter error. The final sample was 40 children (14 males, 26 females), aged between 47 and 60 months ($M = 54.15, SD = 3.40$).

Results

Effect of Agent Type on Helping Behaviour

A one-way between groups ANOVA was conducted to evaluate the effect of condition on helping behaviour. There was no significant effect of condition on helping behaviour, $F(1, 38) = 1.45, p = .236, \eta^2 = .037$, such that children were equally likely to help an adult agent ($M = .65, SD = 1.69$) and a puppet agent ($M = 1.50, SD = 2.67$).

Exploratory Analyses

Helping. A total of 11 children helped the distressed agent. This included 4/20 children in the adult condition and 7/20 children in the puppet condition (See Figure 5). The proportion of children helping the agent did not significantly differ by condition, $\chi^2 (1, N = 40) = 1.13, p = .288$.

![Figure 5. Percentage of children who helped or did not help within each condition.](image)

Consoling. A total of four children consoled the distressed agent when they did not help. There was no significant difference in the proportion of children consoling the distressed agent when they did not help across both conditions, indicated by Fisher’s Exact Test, $p = .698$.

Disengaging. A total of 19 children disengaged from the distressed agent when they did not help. There was no significant difference in the proportion of children disengaging from the distressed agent when they did not help across both conditions, indicated by Fisher’s Exact Test, $p = .438$.

Social Referencing. In the adult condition, when the adult became distressed, 14/20 children demonstrated social referencing by looking at the other experimenter in the room. In trial 1, 12/20 children socially referenced. In trials 2 and 3, 11/20 children socially referenced. There was no significant difference in the proportion of children who helped the distressed adult between those who socially referenced and those who did not, indicated by Fisher’s Exact Test, $p = .549$.

In Study 4 we found no effect of recipient on children’s helping, such that they helped adult and puppets the same amount, were equally likely to help adult and puppets, and equally likely to console and disengage from adults and puppets when they did not help. This finding could have been partly driven by
having a third party, the adult experimenter in the room, who the child often referred to as a possible
gauge on what to do.

**Study 5: Help Me, We Are In The Same Group!**

In Study 5 we test a different social boundary of compassion: group membership. There is extensive
literature demonstrating that young children are strongly biased toward in-groups. Children like in-group
members more [38, 18, 36, 39], prefer them as social learning models for both selective trust [36] and
imitation tasks [40, 41], and also behave more prosocially towards them; opting to share resources with
them over others [42, 17]. Yet, no work has examined group biases in the context of explicit compassion.
Interestingly, our sense of group membership is malleable and can be influenced by contextual factors.
Research using minimal group paradigms, where group membership is arbitrary (i.e., temporarily
assigning group colour), found that it is sufficient to induce in-group preference and helping [43, 18, 44,
45, 46]. We, thus, examined how group bias in a minimal group context would influence compassionate
behaviour. We predicted that children would be more compassionate to those who are group members
compared to those who are not.

**Method**

We again replicated the cost condition in the original compassionate responding paradigm [12]. However,
we varied whether the recipient of help (the puppet) was a member of the child’s group or not. There were
three levels of group membership: no group, group assignment, and enhanced group assignment. In the
group assignment conditions, a minimal group paradigm was used where the child and puppet were
assigned to the same group, which was established by them wearing the same group color (a yellow sash
and bandana). Children and puppets were assigned to groups by drawing out a coloured token from the
same drawstring bag. However, unbeknown to children, there were only yellow tokens and thus, children
and puppets were always in the same yellow group. The group enhancement condition also included the
puppets verbally highlighting their shared group membership with the children. This was done by
including an additional sentence to the original distress prompts (see Supplementary Materials). Thus,
children were either assigned to a no group condition, to the same group as the puppet using a minimal
group paradigm (group assignment condition), or to the same group as the puppet and the puppet
referenced this in their distress (e.g. "**We’re in the same group, you are getting a sticker but I won’t**") (group
enhancement condition).

**Participants**

In study 5 a total of 82 children participated in this experiment. Five children were excluded from the final
analysis due to experimenter error or participant error. The final sample included 77 children (35 males:
42 females) aged between 44 and 61 months ($M = 53.21, SD = 3.92$).

**Results**
Effect of Group Membership on Helping Behaviour

We conducted a one-way between groups ANOVA to examine the influence of condition on helping behavior. There was no significant effect of condition on helping behaviour, $F(2, 74) = 0.67, p = .513, h^2 = 0.02$, such that children were equally likely to help in the no group ($M = 3.24, SD = .81$), group assignment ($M = 2.29, SD = .58$), and group enhancement ($M = 2.13, SD = 0.80$) conditions.

Exploratory Analyses

Helping. A total of 33 children helped the puppet when it was distressed, 12/25 children in the no group condition, 14/28 in the group assignment condition and 7/24 in the group enhancement condition. There was no significant difference in the proportion of children that helped the puppet across all the conditions, $p = .261$.

Consoling. A total of 16 children consoled when they did not help the puppet when it was distressed. There was no significant difference in the proportion of children consoling the distressed target across conditions, indicated by Fisher’s exact test, $p = .414$.

Disengaging. A total of 39 children disengaged when they did not help the distressed puppet, 16/24 children in the group enhancement condition, 15/28 children in the group assignment condition, and 8/25 children in the no group condition, a significant difference in proportion, $p = .049$. Post-hoc multiple comparisons using the z-test of two proportions, revealed that the proportion of children who disengaged in the group enhancement condition was significantly higher than in the no group condition, $p = .018$. The proportion of children who disengaged in the group assignment condition was not statistically different from either the no group or group enhancement conditions, $p = .117$.

Due to significant differences in proportion for disengaging behaviour across conditions, we also conducted a binomial logistic regression to ascertain the effect of condition on the likelihood of children disengaging. The logistic regression model was statistically significant, $c^2 (df = 1, N = 77) = 6.16, p = .046$. The model explained 10% (Nagelkere $R^2$) of the variance in disengagement and correctly classified 62.3% of cases. In comparison to no group condition, group enhancement condition was a significant predictor of disengagement behavior (Table 2), such that being in the group enhancement condition is associated with an increase in the odds of disengagement by a factor of 4.256.

Table 2 Result From Logistic Regression Between Condition and Disengagement.
In Study 5 we found that the proportion of children who disengaged after not helping the puppet was significantly higher in the group enhancement condition than the control condition. We do not find any effect of group membership on overall rates of helping, or the proportion of children who engaged in helping or consoling behaviour when they did not help.

**General Discussion**

In this series of studies, we aimed to explore the bounds of compassion in young children. Across five studies, we examined the role of cost (Studies 1–3) and the recipient of compassion (Studies 4 and 5) in 4–5-year-old children using an adapted version of an established compassionate responding paradigm [12]. We found strong evidence that cost reduces compassionate responding. When children were able to help without sacrificing their reward, rates of helping increased. Similarly, when they were given explicit instructions indicating that they could help—and thus helping was foregrounded—rates increased. That is, when the competitive aspect of the task is removed children appear more willing to help. By contrast, the recipient of compassion did not appear to influence compassionate responding: children were equally likely to help a human adult and a puppet, and an in-group member and neutral agent.

These findings indicate that personal cost is a greater inhibitor to compassionate responding than who compassion is directed toward. This aligns with adult literature which suggests that personal cost to self [11], and competitive self-interest [13] are inhibitors to compassion. However, not all methods of reducing cost increased compassion. In Study 3, drawing from a pool of shared resources had little impact on children’s responding. It is possible that children saw the ‘finite’ amount of resources available in the shared bucket and realised they had to get the pieces they needed before the puppet. In this way, the shared resource condition may have primed competitive self-interest, as opposed to increasing compassionate behaviour.

Although rates of helping increased when cost was removed or reduced, rates were still low overall. None of our manipulations led to even moderate rates of helping. Even in the explicit instruction condition only 50% of the children helped, and they only helped after a series of distress prompts. Although this is consistent with past research detailing that young children are often unwilling to engage in costly
prosocial behaviour [47], it is possible that something about this particular paradigm produces low helping rates. For example, the parallel nature of both puppet and child completing the same task may have led to a more competitive environment. A different procedural paradigm where the child and puppet are completing different tasks or activities that still manipulates cost and distress might be able to shed further light into this compassionate responding. Additionally, participants cultural backgrounds may have contributed to their low level helping. Past work has revealed clear cross-cultural differences in helping behaviour [48]. Most participants in these studies were from WEIRD (Western, Educated, Industrialised, Rich, Democratic) populations which are known to be individualistic. Examining compassionate responding in more collectivist cultures or cultures that place greater emphasis on compassion could lead to different response patterns.

Although compassionate responding was low across all studies, children did distinguish between targets in some compassionate responses (e.g. more disengaging after not helping in-group members). This indicates that they did distinguish between targets, at least in Study 5, but that target did not appear to greatly influence their compassionate responding. This suggests that they may be, at least somewhat, impartial in their compassionate responding. This contrasts the dominant narrative that young children are self-serving [49], but aligns with recent work suggesting that children may be more morally expansive than adults in certain contexts [50].

There are also other facilitators that have been shown to influence compassionate responding in adults that were not tested here, such as prosocial modelling, or perhaps a target where a bond has been formed, or the puppet is a liked or disliked target. Notably most of these suggested factors vary at an individual level, rather than being context specific as was the case for all facilitators and inhibitors tested here. As such, these individual differences may represent a more promising avenue to increasing compassionate responding. Finally, a developmental analysis was not explored in the current studies, and older children may respond differently. As children age social norms are more embedded and children display greater self-control, thus children from this age may be more willing (or able) to engage in compassionate behaviour, as has been found with other prosocial and altruistic behaviours [51, 52, 53].

Here we provide the first test of the bounds of children's compassionate responding in a behavioural task. We find strong evidence that personal cost is a key inhibitor to compassionate behaviour, which in turn suggests that reducing cost may facilitate compassion. Our findings also indicate that young children are impartial in where their compassion is directed—being similarly willing to help in-groups and outgroups, as well as humans and puppets. Finally, we find behavioural evidence of guilt or shame associated with not helping. Taken together, these five studies provide the first systemic exploration of the contextual factors that inhibit and facilitate compassion in young children.

**Declarations**

**Conflict of Interest:**

The authors have no conflict of interest to declare.
Ethics Declaration

All studies had been cleared in accordance with the ethical review processes of the University of Queensland, and within the guidelines of the National Health and Medical Research Council's guidelines (#2019000651).

Author Contributions:


References


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**Figures**
Figure 1

The effect of condition on helping behaviour. Error bars represent +/- 1 standard error of the mean for each condition.
Figure 2

Percentage of children who helped or did not help within each condition.
Figure 3

Percentage of children who helped or did not help within each condition.
Figure 4

Percentage of children who helped or did not help within each condition
Figure 5

Percentage of children who helped or did not help within each condition.

Supplementary Files

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- SupplementaryMaterialALL20.05.2021.pdf